



# Wood Smoke and Your Health

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## Introduction

Imagine what it would be like to live in a heavily industrialized area, with air pollution so bad that even jogging or bicycling would be hazardous to your health. Would you want to live in such a place? Most of us would not. Yet, at times, that's how dirty the air is over many residential areas in Washington.

Nearly half of Washington's households have wood burning devices, such as wood stoves, fireplace inserts, and fireplaces. Wood stoves and fireplaces account for about 12 percent of Washington's overall air pollution problem and it only takes a six-month heating season to reach that mark. Wood smoke is the main source of air pollution in many Washington residential areas during the winter the worst season for neighborhood air quality.

Wood smoke poses a health threat to wood stove and fireplace users and to their neighbors.

## General Health Effects

### Breathing air containing wood smoke can:

- ❖ reduce lung function, especially in children;
- ❖ increase severity of existing lung diseases such as asthma, emphysema, pneumonia and bronchitis;
- ❖ aggravate heart disease;
- ❖ increase susceptibility to lower respiratory diseases;
- ❖ irritate eyes, lungs, throat and sinuses;
- ❖ trigger headaches and allergies.

### Long term exposure to wood smoke may lead to:

- ❖ chronic obstructive lung disease;
- ❖ chronic bronchitis;
- ❖ increased risk of cancer and genetic mutations (based on animal studies).

## What's in Wood Smoke?

Many individual components of wood smoke can cause health problems. These compounds include:

- ❖ *Carbon monoxide* - invisible and odorless; fatal in high concentrations; impairs thinking and reflexes; causes heart pain; associated with lower birth weights and increased deaths among newborns.

- ❖ *Formaldehyde* - causes nose and throat cancer in animals - circumstantial evidence suggests it may cause cancer in humans.
- ❖ *Organic gases* - includes aldehyde gases and other respiratory irritants which can interfere with lung function and can cause inflammation of the throat and sinuses, or allergic reactions.
- ❖ *Nitrogen oxides* - linked to hardening of the arteries, immune system damage; facilitates the spread of cancer (effects all based on animal research).
- ❖ *Tiny smoke particles* - can cause chemical and structural changes to human lung tissue; measured decreases in human lung function; cancer and genetic mutations clearly established in animal studies.

## **Smoke Particles**

The tiny particles in wood smoke pose especially important health concerns. They are less than 10 microns across (the period at the end of this sentence is about 500 microns wide). Our bodies' natural defenses cannot protect us from these pieces of matter. Instead, we inhale them deep into our lungs where they can become lodged. These particles can cause structural damage and chemical changes to the lung tissue, and reduce resistance to infection.

Cancer-causing and toxic compounds often attach themselves to the tiny particles and hitchhike on them into the lungs. Wood stoves and fireplaces release more of these particles into the air in Washington each year than industry and motor vehicle exhaust sources *combined*.

Air polluted with tiny particles, such as those in wood smoke, has been linked to increased deaths in London and U.S. cities where daily records of fine-particle air pollution are available. The increased death rates occur mainly among people over 65 and those suffering from lung and heart diseases. Based on this research, as many as 60,000 U.S. residents may die each year from exposure to air polluted with these particles at levels which may not even violate the current federal health standard for this kind of pollution. Parts of King, Pierce, Thurston, Yakima, Spokane, Benton, Franklin and Walla Walla counties currently violate this standard.

## **Wood Smoke Gets Around the Neighborhood**

During the winter heating season, Washington's weather patterns often restrict air circulation. Any pollution becomes trapped and concentrated near the ground during these "air stagnation" periods. Unfortunately staying indoors may not afford much escape. Wood smoke particles are so tiny they seep into houses-even through closed doors and windows.

A recent study shows that wood smoke pollution indoors can reach up to 70 percent of the outside pollution level even in homes which do not burn wood. Neighbors of wood burners may unwittingly breathe smoky air, even if they do not burn wood indoors themselves.

## **Whom Can Wood Smoke Harm the Most?**

Those who run the greatest health risk from wood smoke include:

- ❖ fetuses, infants and children;
- ❖ people with asthma, bronchitis, emphysema, or pneumonia;

- ❖ people with other lung, heart, or circulatory system diseases;
- ❖ the elderly;
- ❖ allergy sufferers;
- ❖ cigarette smokers and ex-smokers.

Even healthy people are at risk from wood smoke. Those who are physically active are advised to reduce physical activities during air stagnation periods.

Wood smoke poses a special health threat to infants and young children. It interferes with the normal development of their lungs. Also, their risk of lower respiratory tract infections, a major cause of early childhood death and illness, increases.

University of Washington researchers have documented more symptoms of respiratory disease in Seattle preschool children who live in neighborhoods with higher wood smoke levels than in those who live in areas with lower wood smoke levels. Tests also show measurable reductions in lung function of asthmatic children in smoky Seattle neighborhoods in the winter.

## **What Can You Do?**


Wood smoke can harm your health. It can affect everyone, even neighbors who don't heat with wood. If you heat with wood, consider cleaner alternatives such as gas, electric or oil heat and be sure your house is properly weatherized to use energy in the most efficient way possible. If you must use wood, replace older stoves with newer certified cleaner-burning models; and learn the correct way to use your stove and reduce its pollution.

## **For More Information**

Washington State Energy office Toll Free Energy Hotline: 1-800-962-9731.

This information is based on an Ecology booklet, *Health Effects of Wood Smoke*, which cites recent scientific studies and literature on the subject. It is available at public libraries.

*If you have special accommodation needs, please contact Judy Beitel, Washington State Department of Ecology's Air Program at (360) 407-6878 (voice); (360) 407-6006 (TDD). Ecology is an Equal Opportunity and Affirmative Action employer.*

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